AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A process for producing a proton-conducting polymer membrane which is based on polyazoles ~~and is obtainable by a process~~ comprising the steps
   A) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in phosphoric acid wherein the phosphoric acid does not contain any polyphosphoric acid to form a solution and/or dispersion,
   B) heating of the solution and/or dispersion obtained in step A) to temperatures of up to 350°C to form the polyazole polymer,
   C) application of a layer using the mixture from step B) to a support,
   D) ~~treatment of~~ treating the membrane formed in step C).

2. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein 3,3',4,4'-tetraaminobiphenyl, 2,3,5,6-tetraaminopyridine, 1,2,4,5-tetraaminobenzene, bis(3,4-diaminophenyl)sulfone, bis(3,4-diaminophenyl) ether, 3,3',4,4'-tetraaminobenzophenone, 3,3',4,4'-tetraaminodiphenylmethane and 3,3',4,4'-tetraaminodiphenyldimethylmethane are used as aromatic tetraamino compounds.

3. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein isophthalic acid, terephthalic acid, phthalic acid, 5-hydroxyisophthalic acid, 4-hydroxyisophthalic acid, 2-hydroxyterephthalic acid, 5-aminoisophthalic acid, 5-N,N-dimethylaminoisophthalic acid, 5-N,N-diethylaminoisophthalic acid, 2,5-dihydroxyterephthalic acid, 2,5-dihydroxyisophthalic acid, 2,3-dihydroxyisophthalic acid, 2,3-dihydroxyphthalic acid, 2,4-dihydroxyphthalic acid, 3,4-dihydroxyphthalic acid, 3-fluorophthalic acid, 5-fluoroisophthalic acid, 2-fluoroterephthalic acid, tetrafluorophthalic acid, tetrafluoroisophthalic acid, tetrafluoroterephthalic acid, 1,4-naphthalenedicarboxylic acid, 1,5-naphthalenedicarboxylic acid, 2,6-naphthalenedicarboxylic acid, 2,7-naphthalenedicarboxylic acid, diphenic acid, 1,8-dihydroxynaphthalene-3,6-dicarboxylic acid, bis(4-carboxyphenyl) ether, benzophenone-4,4'-dicarboxylic acid, bis(4-dicarboxyphenyl) sulfone, biphenyl-4,4'-dicarboxylic acid, 4-trifluoromethylphthalic acid, 2,2-bis(4-carboxyphenyl)hexafluoropropane, 4,4'-stilbenedicarboxylic acid, 4-carboxycinnamic acid, or their C1-C20-alkyl esters or C5-C12-aryl esters, or their acid anhydrides or acid chlorides are used as aromatic dicarboxylic acids.

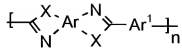
4. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the aromatic carboxylic acids are tricarboxylic acids, tetracarboxylic acids or their C1-C20-alkyl esters or C5-C12-aryl esters or their acid anhydrides or their acid chlorides.

5. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein tetracarboxylic acids, their C1-C20-alkyl esters or C5-C12-aryl esters or their acid anhydrides or their acid chlorides are used as aromatic carboxylic acids.

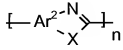
6. (Currently Amended) The ~~membrane~~ process as claimed in claim 4, ~~characterized in that~~ wherein the content of tricarboxylic acids and tetracarboxylic acids (based on dicarboxylic acid used) is from 0.5 to 20 mol%.

7. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein heteroaromatic dicarboxylic acids and tricarboxylic acids and tetracarboxylic acids containing at least one nitrogen, oxygen, sulfur or phosphorus atom in the aromatic, are used as heteroaromatic carboxylic acids.

8. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein a polyazole-based polymer comprising recurring azole units of the general (I)-(XXII) or a mixture thereof,



(I)



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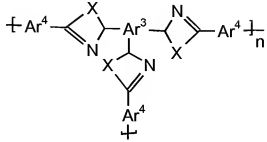

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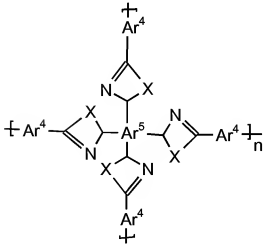

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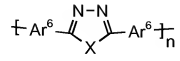

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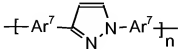

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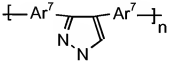

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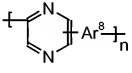

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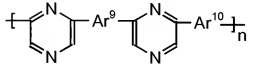

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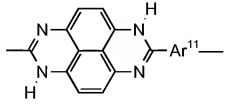

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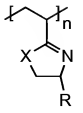

(XI)

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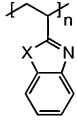

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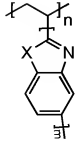

(XV)

(XVI)

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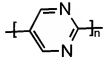

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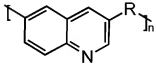

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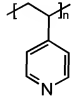
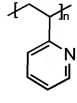


(XXI)



(XXII)

where

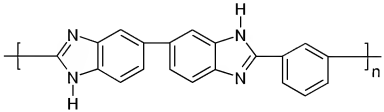
the radicals Ar	are identical or different and are each a tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^1	are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^2	are identical or different and are each a divalent or trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^3	are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^4	are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^5	are identical or different and are each a tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^6	are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^7	are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^8	are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^9	are identical or different and are each a divalent or trivalent or tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^{10}	are identical or different and are each a divalent or trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals Ar^{11}	are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
the radicals X	are identical or different and are each oxygen, sulfur or an amino group which bears a hydrogen atom, a group having 1-20 carbon atoms, preferably a branched or unbranched alkyl or alkoxy group, or an aryl group as further radical,
the radicals R	are identical or different and are each hydrogen, an alkyl group or an aromatic group and
n, m	are each an integer greater than or equal to 10,

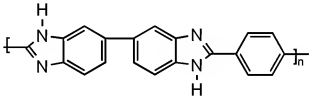
is formed in step B).

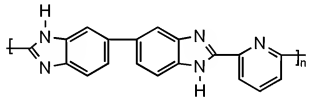
9. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein a polymer selected from the group consisting of polybenzimidazole,

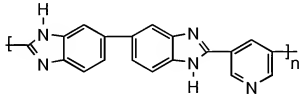
poly(pyridines), poly(pyrimidines), polyimidazoles, polybenzothiazoles, polybenzoxazoles, polyoxadiazoles, polyquinoxalines, polythiadiazoles and poly(tetrazapyrenes) is formed in step B).

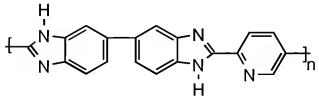
10. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein a polymer comprising recurring benzimidazole units of the formula

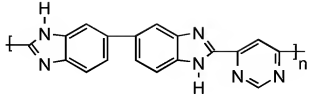


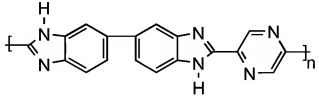


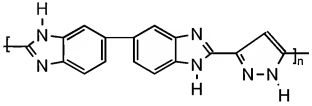


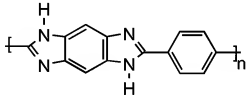


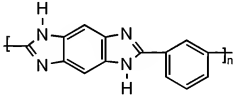


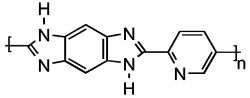


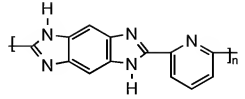


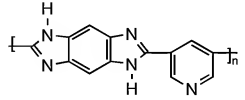


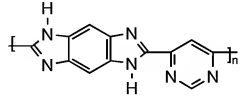


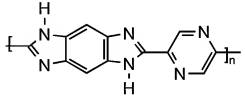


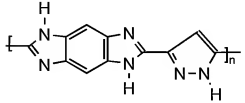


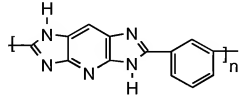


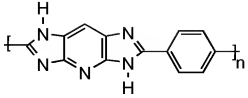


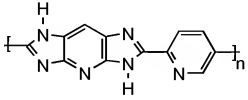


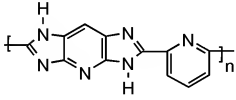


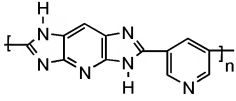


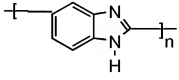


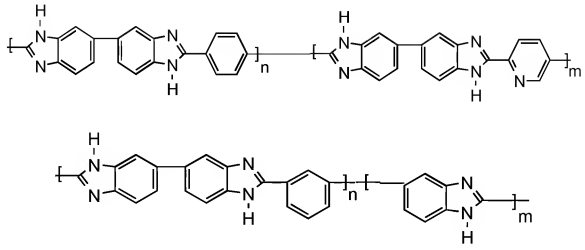












where n and m are each an integer greater than or equal to 10~~, preferably greater than or equal to 100~~,
is formed in step B).

11. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the viscosity is adjusted by addition of phosphoric acid after step B) and before step C).

12. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein a layer having a thickness of from 20 to 4000 µm, ~~preferably from 30 to 3500 µm, in particular from 50 to 3000 µm,~~ is produced in step C).

13. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane produced in step C) is treated in step D) until the membrane is self-supporting and can be detached from the support without damage.

14. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane produced in step C) is treated in step D) by the action of heat in the presence of atmospheric oxygen.

15. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane produced in step C) still contains tricarboxylic or tetracarboxylic acids which are crosslinked in step D).

16. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane produced in step C) is crosslinked by treatment with sulfuric acid in step D).

17. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane produced in step C) is crosslinked by action of IR or NIR light or by irradiation with ß-rays in step D).

18. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the membrane has a layer comprising a catalytically active component.

19. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the formation of the membrane according to steps A) to D) is carried out on a support or a support film on which the catalyst is present, and the catalyst is located on the membrane ~~according to the invention~~ after removal of the support or the support film.

20. (Currently Amended) The ~~membrane~~ process as claimed in claim 1, ~~characterized in that~~ wherein the formation of the membrane according to steps A) to D) is carried out on an electrode as support.

21. (Currently Amended) A process for producing an electrode ~~An electrode~~ provided with a proton-conducting polymer coating which is based on polyazoles ~~and is obtainable by a process~~ comprising the steps

A) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in phosphoric acid wherein the phosphoric acid does not contain any polyphosphoric acid, to form a solution and/or dispersion,

B) heating of the solution and/or dispersion obtained in step A) to temperatures of up to 350°C to form the polyazole polymer,

C) application of a layer using the mixture from step B) to an electrode,

D) optionally ~~treatment of~~ treating the membrane formed in step C).

22. (Previously presented) The ~~electrode~~ process as claimed in claim 21, wherein the coating has a thickness in the range from 2 to 3000 µm.

23. (Currently Amended) A membrane-electrode unit comprising at least one electrode and at least one membrane as claimed in ~~claim 1~~ claim 34.

24. (Currently Amended) A membrane-electrode unit comprising at least one electrode wherein said at least one electrode comprises at least one membrane as claimed in ~~c claim 1~~ claim 34.

25. (Previously presented) A fuel cell comprising one or more membrane-electrode units as claimed in ~~claim 22~~ claim 24.

26. (Currently Amended) A process for producing a polymer film which is based on polyazoles ~~and is obtainable by a process~~ comprising the steps including the steps of producing the polymer membrane according to claim 1,
   A) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in phosphoric acid wherein the phosphoric acid does not contain any polyphosphoric acid, to form a solution and/or dispersion,
   B) heating of the solution and/or dispersion obtained in step A) to temperatures of up to 350°C to form the polyazole polymer,
   C) application of a layer using the mixture from step B) to a support,
   D) ~~treatment of~~ treating the membrane formed in step C) until it is self-supporting,
   E) ~~detachment of~~ detaching the membrane formed in step C) from the support,
   F) ~~removal of~~ removing the phosphoric acid present and drying.

27. (Currently Amended) The ~~polymer film~~ process as claimed in claim ~~25, characterized in that~~ 26, wherein the removal of the phosphoric acid in step F) is carried out by means of a treatment liquid.

28. (Cancelled)

29. (Currently Amended) A process for producing a polymer which ~~is based on polyazoles defined in claim 8, whose molecular~~ has a molecular weight expressed as intrinsic viscosity is at least 1.4 dl/g ~~and which is obtainable by a process~~ comprising the steps
   A) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per

carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in phosphoric acid wherein the phosphoric acid does not contain any polyphosphoric acid, to form a solution and/or dispersion,

B) heating of the mixture obtainable according to step A) under inert gas to temperatures of up to 350°C to form the polyazole polymer,

C) precipitation of the polymer formed in step B) and isolation and drying of the polymer powder obtained.

30. (Cancelled)

31. (Currently Amended) A process for producing a polymer fiber which is based on polyazoles, whose molecular weight expressed as intrinsic viscosity is at least 1.4 dl/g ~~and which is obtainable by a process~~ comprising the steps

A) mixing of one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid wherein the phosphoric acid does not contain any polyphosphoric acid, to form a solution and/or dispersion,

B) heating of the mixture obtained in step A) to temperatures of up to 350°C to form the polyazole polymer,

C) extrusion of the polyazole polymer formed in step B) to form fibers,

D) ~~introduction of~~ introducing the fibers formed in step C) into a liquid bath,

E) ~~isolation~~ isolating and drying of the fibers obtained.

32. (Currently Amended) The ~~polymer fiber~~ process as claimed in claim 30, ~~characterized in that~~ claim 31, wherein the fibers formed in step C) are introduced into a precipitation bath.

33. (Currently Amended) A process for the filtration and/or separation of gases and/or liquids or in reverse osmosis which comprises ~~using~~ utilizing the polymer film as claimed in claim 25.

34. (New) A proton-conducting polymer membrane obtained by the process as claimed in claim 1.